Immunologic and inflammatory mechanisms that drive asthma progression to remodeling

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Learning objectives: “The immunologic and inflammatory mechanisms that drive asthma progression to remodeling”

1. To better understand the characteristics of the cells and factors involved in T\textsubscript{H}2-mediated inflammation and airway remodeling.
2. To recognize genetic factors involved in the pulmonary response to atopy.

CME items

Question 1. GATA-3 expression is most critical for expressing which of the following cytokines?
A. IL-5
B. IL-12
C. IFN-\gamma
D. IL-2

Question 2. Anti–IL-5 therapy of human asthma improves which of the following parameters?
A. FEV\textsubscript{1}/forced vital capacity (FVC)
B. extracellular matrix deposition
C. symptom scores
D. airway hyperreactivity

Question 3. Recruitment of eosinophils into lung tissue at sites of allergic inflammation is likely to be most strongly suppressed by an antagonist of —
A. eotaxin.
B. CCR2.
C. RANTES.
D. CCR3.

Question 4. Which of the following skew development of the immune response to a T\textsubscript{H}2 phenotype at the earliest developmental time point?
A. thymic stromal lymphopoietin
B. IL-4
C. IL-13
D. eotaxin

Question 5. A potential role for chymase + mast cells (MC\textsubscript{TC} type) in the remodeling of airway smooth muscle in asthma is best raised by which of the following?
A. increased MC\textsubscript{TC} cells in asthmatic bronchial smooth muscle
B. increased MC\textsubscript{TC} cells in the alveolar wall
C. increased MC\textsubscript{TC} cells in the epithelium.
D. increased expression of vascular endothelial growth factor by mast cells in asthmatic lung

Question 6. Which of the following is most important for mammalian TGF-\beta signaling?
A. Janus kinase 1
B. Smad3
C. signal transducer and activator of transcription 6
D. calcineurin

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**Question 7.** Which of the following is considered a matrix metalloproteinase (MMP)?

A. collagenase  
B. elastase  
C. chymase  
D. carboxypeptidase A3

**Question 8.** The relationship between MMP-9 secretion and airway remodeling can best be described as —

A. likely based on finding elevated levels in the bronchoalveolar lavage fluid (BALF) of patients with asthma.  
B. tenuous based on mouse studies showing little if any impact of knocking out MMP-9 on mucus expression, airway hyperreactivity, and smooth muscle thickness.  
C. likely based on the demonstrated ability of MMP-9 to influence the turnover of matrix-associated proteins.  
D. tenuous based on the inability of steroids to dramatically alter MMP-9 levels in BALF.

**Question 9.** A disintegrin and metalloprotease 33 (ADAM33) polymorphism has been most closely associated with —

A. IgE levels.  
B. bronchial hyperresponsiveness.  
C. eosinophil recruitment.  
D. FEV1/FVC.

**Question 10.** Endothelial cell nitric oxide production is most increased by which of the following?

A. TSLP  
B. VEGF  
C. TGF-β  
D. MMP-9